

Focus on plant cells

If all living things are made up of cells, why aren't they all the same?

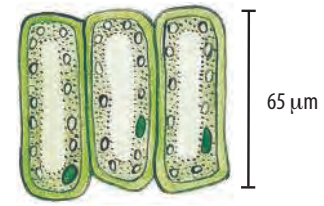
Have or have not

Like animal cells, plant cells have cytoplasm, a membrane and a nucleus. Unlike animal cells, plant cells have a cellulose cell wall and a large central vacuole filled with cell sap. Often plant cells also contain chloroplasts, which enable them to make their own food.

On the surfaces of leaves, there are pairs of special cells called guard cells, which surround tiny pores called stomata. The guard cells can change shape, opening or closing the stomata. Special cells on the roots extend into microscopic hairs that penetrate between soil particles. The hairs provide a big surface area through which water may be absorbed from the soil.

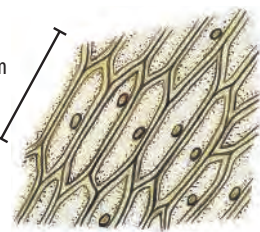
Leaf cells (palisade cells)

The main function of leaf palisade cells is to photosynthesise, so they are packed with chloroplasts and are usually green.



Leaf cell

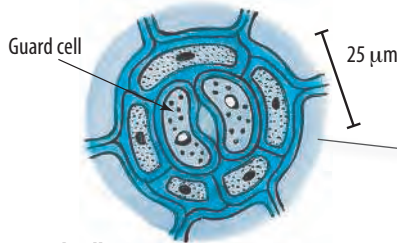
150 µm



Epidermal cells

Epidermal cells

Epidermal cells are found on the outside of the plant. They form an outer skin for the plant and protect the cells underneath. This explains why they need a flat shape and why they interlock like tiles. Epidermal cells do not usually photosynthesise so they lack chloroplasts. Light needs to pass through them, and they are usually transparent. The cells in the diagram above are onion epidermal cells.



Guard cells

Guard cells are kidney-shaped cells found on the surface of leaves. They can change shape to either open or close the small hole between them. The small holes, called stomata (or stomates), allow substances such as carbon dioxide to enter the leaf. They also let water out of the leaf. Most plants open their stomata at night; they close their stomata during the day (when it is hotter) to conserve water.



Xylem cells

Xylem cells

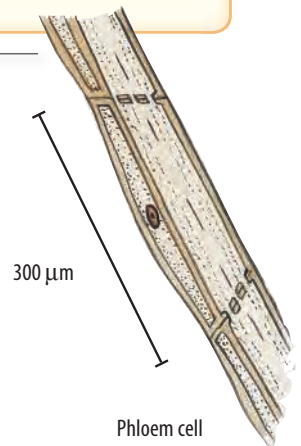
Xylem cells form xylem tubes, which carry water and dissolved minerals from the roots to all parts of the plant. They are made up of dead xylem cells joined end to end. When xylem cells die, the cell walls at each end of the cells dissolve, forming a long straw-like tube. They have thick cell walls with lots of cellulose to make the xylem tubes strong.

WHAT DOES IT MEAN?

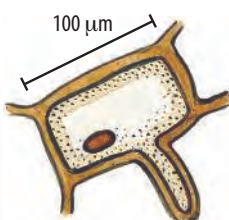
The word *xylem* comes from the Greek word *xulan*, meaning 'wood'. The word *phloem* comes from the Greek word *phloos*, meaning 'bark'.

Phloem cells

Like xylem cells, phloem cells form tubes. The tubes formed by phloem cells carry the food made in the leaves to all parts of the plant. Phloem cells do not need to die to do this job. The ends of phloem cells have holes and look like sieves.



Phloem cell



Root hair cell

Root hair cells

Root hair cells absorb water and dissolved minerals from the soil. They have small hairs, called root hairs, on their surface. This increases the surface area of the root cells so that they can soak up water more quickly.

Some of the types of cells found in plants